

# Refloating the St. Paul a Salvage Marvel

By ROBERT G. SKERRETT.

ONE of the most remarkable salvage tasks ever undertaken has recently been carried through to a successful conclusion right here in the North River. How many New Yorkers appreciate that fact? Yet it is an accurate statement of the magnitude of the work involved in raising the American liner St. Paul from her watery resting place at the bottom of one of the Chelsea slips.

The St. Paul was especially fitted for war service last spring. On April 25 she was started from the shipyard in Brooklyn and towed to her slip between Piers 60 and 61 on the Chelsea waterfront. While being warped to her berth on the south side of Pier 61 she heeled heavily to port, water poured in through various openings and she filled and settled to the bottom, coming to rest with her starboard side uppermost and only fifteen feet above the surface at low tide.

In rolling over the liner smashed her smokestacks and crumpled up her masts. Besides that she dumped overboard a confused mass of rigging, fittings and other materials. The underwater space between the ship and the south side of Pier 61 thus became a veritable labyrinth of wreckage of all sorts.

To make matters worse for the salvors, the lower side of the ship's submerged open decks were down quite fourteen feet in the mud. Finally the fact that the vessel lay within the restricted area of a slip and not out in open water added to the difficulties to be overcome. These details should be borne in mind the better to understand the conditions that hampered the salvors, the Merritt & Chapman Derrick and Wrecking Company.

## Problem Was Doubly Serious.

The wreck presented a twofold problem to the engineers: first, to roll her upright, and second, to pump her out in order to refloat her. But first it was necessary to clear away the damaged masts and smokestacks, remove top weights amounting to hundreds of tons, hoist off her guns and get rid of the litter that lay submerged beside the ship just where the divers would have to operate. Much of this preliminary work was done by divers under exceedingly trying circumstances.

When the ship sank she carried down with her a number of rapid fire rifles intended to repel attacking U-boats. Weapons of that sort were too much in demand to let them remain idle until the St. Paul could be made ready again for sea. Therefore one of the first things called for in lightening her was the removal of the guns.

Those on the starboard or upper side of the wreck were above the surface of the water and could be removed easily, but the lower guns on the port side presented a very different task. They were buried deep in the mud, ten or more feet, and

## Double Problem of Righting Vessel and Pumping Her Out Made Difficult by Small Space



WRECKING PUMPS and PONTOONS in ACTION WHILE LIGHTENING and RIGHTING BIG LINER.

were quite beyond the reach of the underwater workers.

In order that the men might reach the guns the silt overlying the rifles had to be excavated. For this purpose compressed air led through hose was employed to blow away the mud. When the pieces were thus uncovered slings were attached to them so that the weapons could be hoisted to the surface at the right moment, but with this done the most ticklish part of the salvage of the rapid fire guns yet remained unaccomplished.

Before the guns could be raised it was necessary to cast them loose from the deck, to which they were secured by massive bolts and nuts. The divers achieved this despite the dim vision possible in the muddy water and the uncertain footing offered by chance projections from the nearly vertical deck. A false move might have entailed a serious mishap.

## Blasted Away the Top Hamper.

Again, the crumpled masts and smokestacks had to be got out of the way. Not only were these considerable weights, with tangled stays and rigging, but in the case of the funnels the masses of steel were of great bulk and awkward to deal with. By means of skilfully placed sticks of dynamite the masts were severed, and the smokestacks were similarly blasted free about six feet above the uppermost deck. Thus obstacles were finally got rid of.

Ralph E. Chapman, the salvage engineer in charge, thus explains the principal stages of the work:

"When the St. Paul sank and settled into the silt at the bottom of the slip the mud entered the lower part of the liner through numerous openings and also accumulated in the alleyways along decks 1 and 2 on the port side. This accumulation went on from day to day, and it was

important that the hampering process be halted or checked as far as possible, especially inside of the craft.

"Accordingly, we sent divers into the St. Paul at the earliest moment for the purpose of closing all open portholes through which mud might continue to ooze inboard. Only the most expert of our men were chosen for that work, and it was well that we were particular in that respect, for their tasks were both difficult and dangerous.

## Buried in Blankets of Mud.

"Lying as the ship was over on her side the silt had flowed into her through scores of open ports and the points to be reached were buried in blankets of mud ranging from six to eight feet thick. The divers had to search out these openings by using air and water jets, and to get to their objectives it was needful that they follow devious routes and go along passages filled with many pitfalls. The submerged interior of the liner was inky black, and the underwater workers depended entirely upon their acute sense of touch.

"While exploring for openings the divers found that a large hole existed where an ash port connection had been removed. This inlet for the mud was in an awkward place and a good many feet under water. There was no way to seal it except from within the ship, because the place could not be reached from the outside.

"The job involved making a pattern of the opening and its existing bolt holes, fashioning a patch plate and then carrying the plate down and fitting it in place. Again the divers who made the pattern and afterward closed the port worked without light, and notwithstanding there were nearly thirty bolts to be placed and many nuts to be tightened the installing

was effected in less than two days. The patch when subsequently inspected was found to be absolutely watertight.

"Not only were the divers required to close all openings that were likely to interfere with the pumping out of the liner in refloating her, but it was equally necessary to create openings to facilitate the draining of the water to points where it could be reached by the pump intakes. In a number of cases bulkheads and other steel barriers were broken through by means of dynamite to facilitate this movement of the contained water, and the sticks of explosive were tied in place by our underwater workers, the charges being afterward set off by electricity.

"The objection to this procedure lies in the rather extensive structural damage invited locally and the resulting cost of repairs. To offset this J. E. Kirk, machinist foreman and a capable diver, and I experimented for some weeks with a cutting torch of our own devising, and eventually we succeeded in perfecting it so that the oxy-acetylene flame would do its work under all conditions. We were able to cut holes with precision and despatch through any steel wall, and openings were thus made up to fourteen inches in diameter, the actual cutting time being a matter of a very few minutes. The deepest opening made in this way within the St. Paul was more than fifty feet below the surface of the water.

## Had to Seal Many Openings.

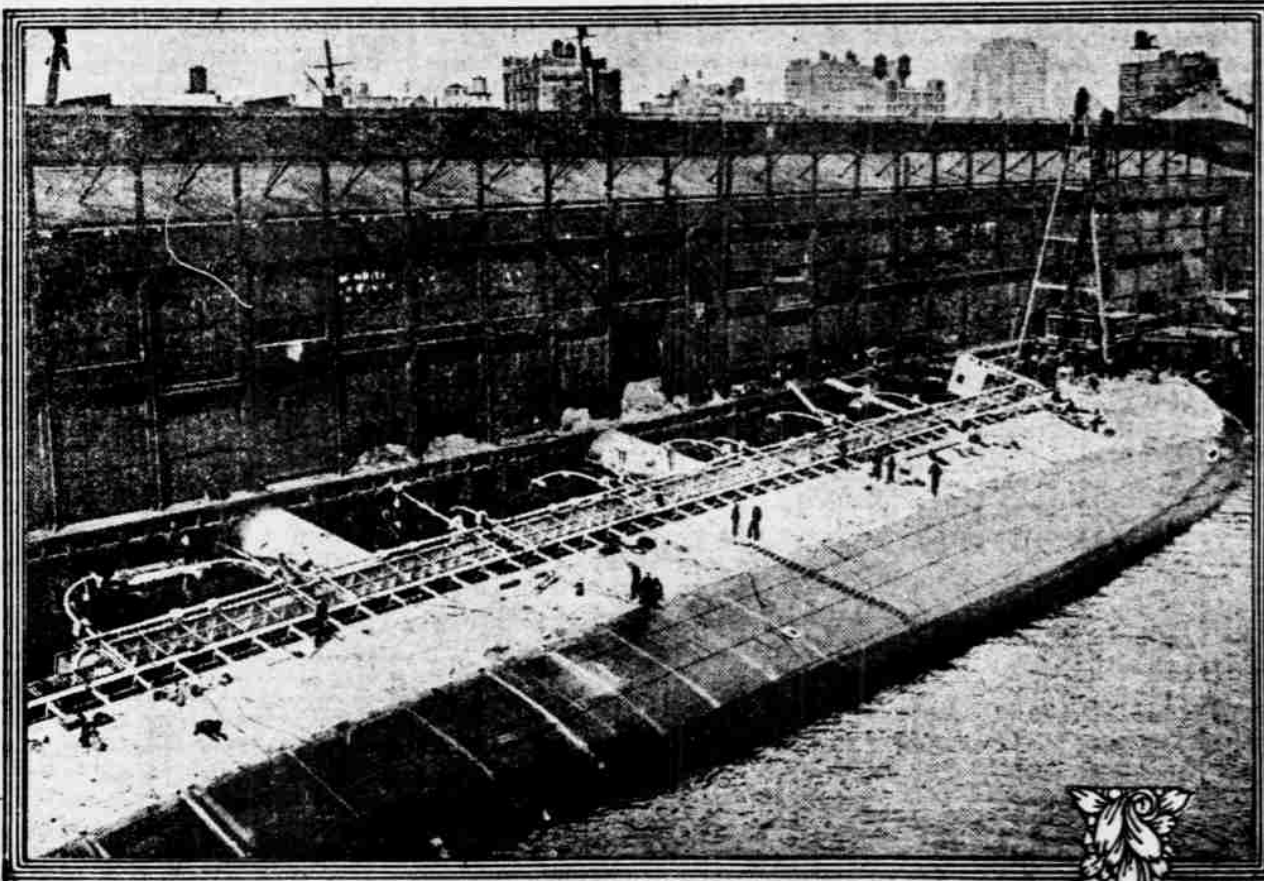
"The work inside the liner involved the sealing of several hundred openings of one sort or another. We decided at the start to isolate the forward and after ends of the craft from her middle body and to pump out the bow and stern regions. To this end it was necessary to close certain of the hatches and to provide temporary barriers.

"For this work we used massive cement patches and walls, which we installed under water. These proved entirely satisfactory and enabled us to exert buoyant impulses just where we wanted them during our initial efforts to turn the vessel upright. The water was controlled by more than twenty pumps, three of them being twelve inch centrifugal wrecking pumps.

"Because of the confined area in which the St. Paul lay it was not deemed practicable to approach her as we might otherwise have done had she been sunk in open waters. The ship sank in a way to block to a large extent the slip between Piers 60 and 61. The slip is 240 feet wide, while the St. Paul, lying on her side, took up quite eighty feet of this, and at one point there was but fifty feet between her upper structure and the nearby dock.

"The liner is 535 feet long and has a beam of 63 feet, and as a mass to be moved she represented more than 13,000 tons, fully double the weight of any other craft ever refloated from a similar posture. We realized that special facilities would have to be employed to roll the craft over on an even keel from her heel of 73 degrees.

"The problem was to turn her upright without shifting her laterally the while, and the rolling pull called for leverage exerted differently at different stages of



THE ST. PAUL AS SHE LAY AT LOW TIDE IMMEDIATELY AFTER SINKING.

© BY MERRITT & CHAPMAN DERRICK & WRECKING CO.

(Continued on Page Seven.)